Image Classification | Radiology Images | ‘Normal’ vs ‘Pneumonia’

IST 718 | Project Checkpoint 1

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**Dataset Description**

The chest x-ray pneumonia dataset contains 6432 chest x-ray images of pediatric patients of one to five years old. The images are labeled as either normal or containing pneumonia (e.g., bacterial, viral, etc.). The dataset is split into a training and test set of 5863 images in total.  The image classification dataset was found on Kaggle, which can be reviewed here: <https://www.kaggle.com/datasets/paultimothymooney/chest-xray-pneumonia>

**Objectives**

The objective of this project is to use the fastai library to develop a classification model for classifying the chest x-ray images into ‘normal’ or ‘pneumonia’ categories. The model will be trained on the training set and evaluated on the test set.  Utilizing the fastai deep learning library will be expected to bring useful results that can assist radiologist in the medical field.

**Fastai**

The fastai library is a deep learning library for python that is built on top of Pytorch. fastai provides a high-level API that makes it easy to build and train deep learning models with less ‘boilerplate’ code (i.e., sections of repeated code with little-to-no variation). The library also includes a number of features that make it well-suited for medical image classification, such as data augmentation and/or transfer learning.

**Pytorch**

Pytorch is a deep learning framework for python that was developed by Facebook AI Research (which is now called Meta AI after Facebook’s rebranding). Pytorch is a flexible and powerful framework that is well-suited for a variety of deep learning tasks, including image classification, natural language processing, and machine translation.  Pytorch’s integration with fastai will, again, make the framework useful for conducting this research.

**Conclusion**

The chest x-ray pneumonia dataset is a valuable resource for developing deep learning models for medical image classification. The fastai library is a powerful tool for building and training deep learning models, and it is well-suited for medical image classification tasks. By combining the chest x-ray pneumonia dataset with the fastai library, it is possible to develop accurate and reliable deep learning models for classifying chest x-ray images.  We hope to showcase high quality results by the end of the IST 718 term.